Course CH343 Lecturer Sam Gellman

Day Wednesday 1:20 Date 10/12/11

Notes Taken By Olivia Phelps Total # of Pages 5

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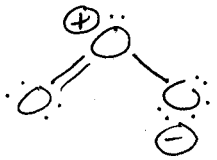
- No office hour on Friday

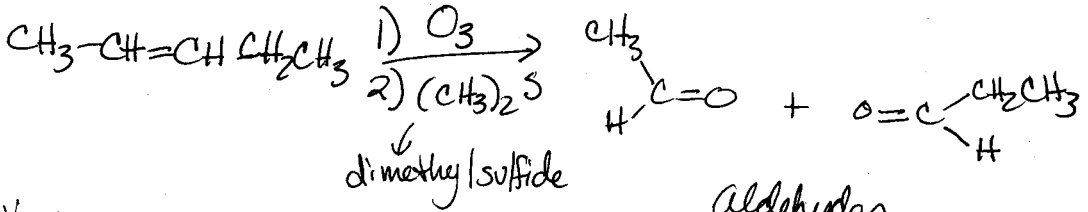
Ozonolysis of alkenes

Ozone = O_3



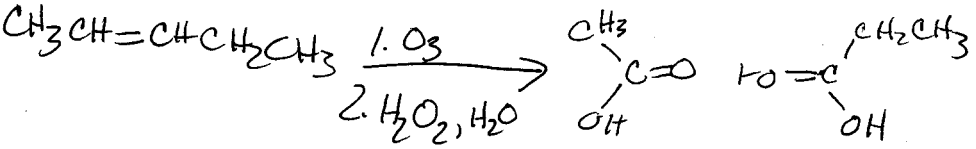
Two variants: both involve 2 steps; differ in 2nd step (sometimes leading to different products)

Ex: (Variant #1)



Aldehydes

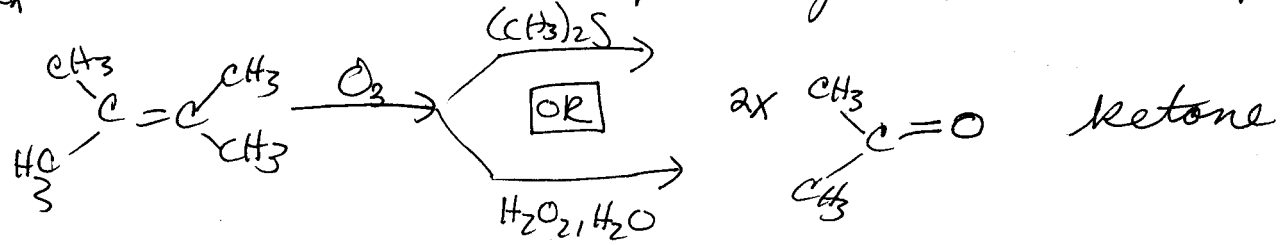
Variant #2



Carboxylic acids

- Some alkenes give the same product from either variant

Ex



Course CH 343 Lecturer Sara Gellman

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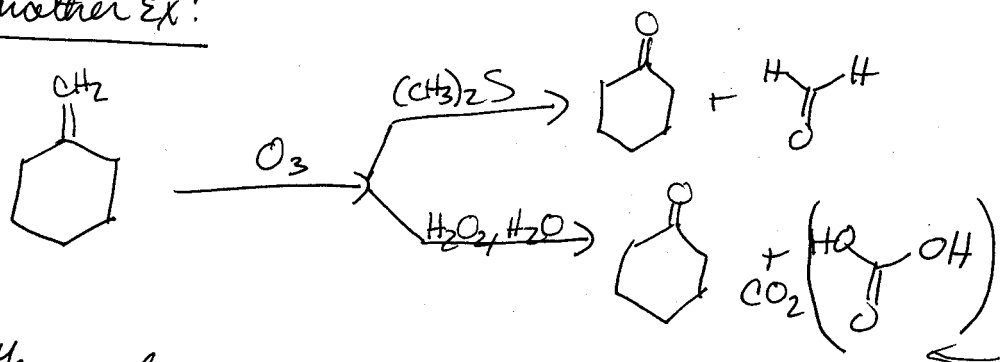
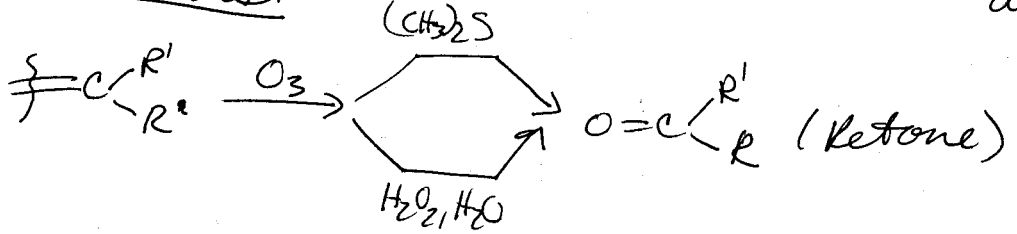
another Ex:



← carbonic acid (in eq. w/ CO_2 + H_2O)

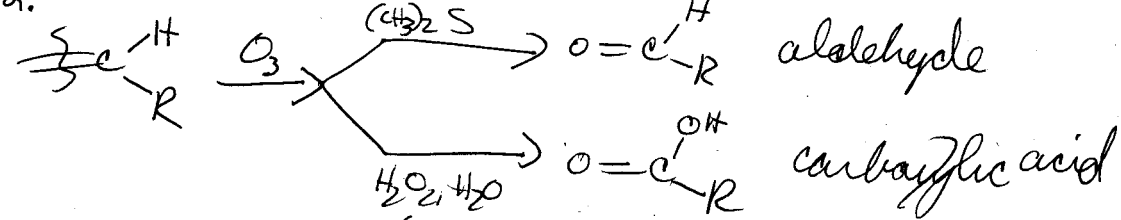
General rules:

1.



(Ketone)

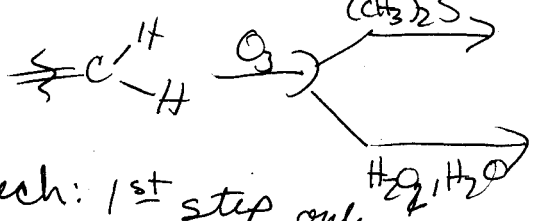
2.



aldehyde

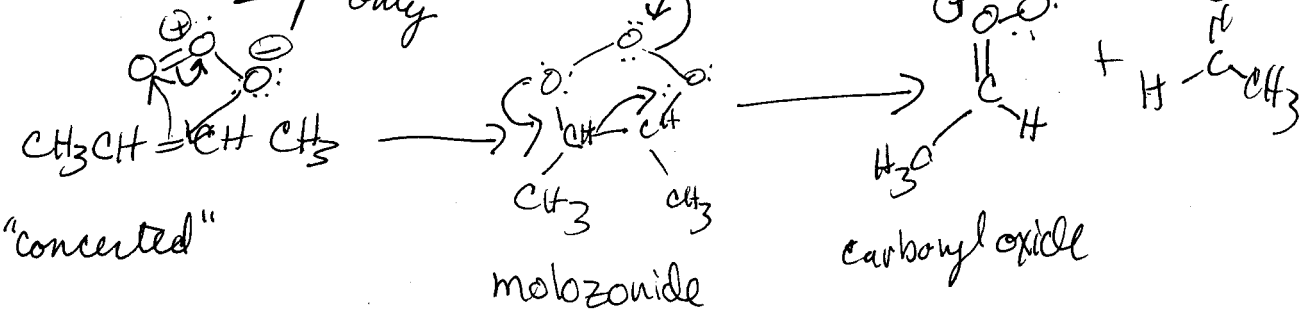
carboxylic acid

3.



you fill in!

Mech: 1st step only



"concerted"

molozonide

carbonyl oxide

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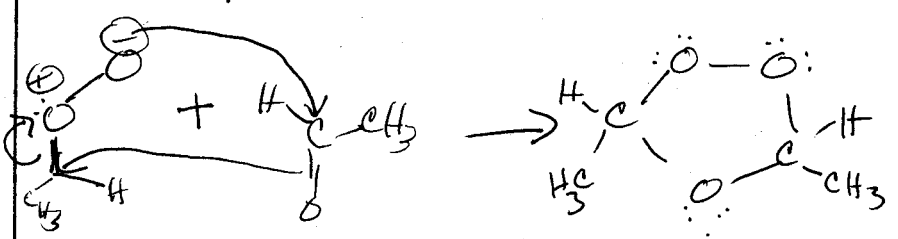
Redraw:



ozonide

END OF 1st STEP

Add $(CH_3)_2S$

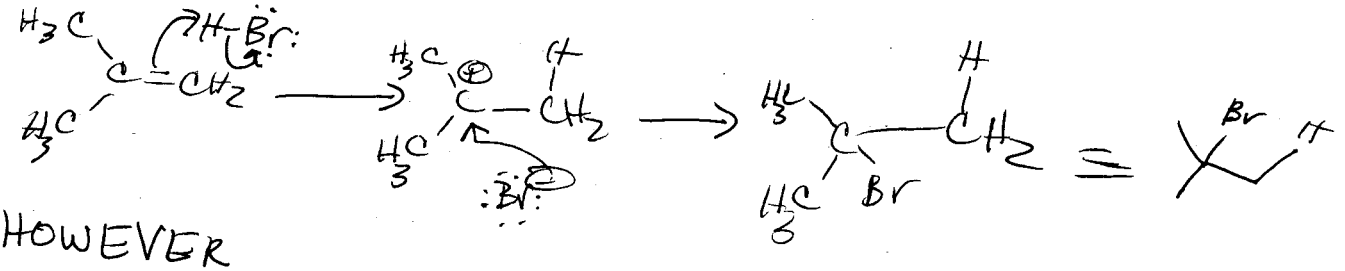
Add H_2O_2, H_2O

Anti-Markonikov addn HBr (not HCl or HI) to alkenes

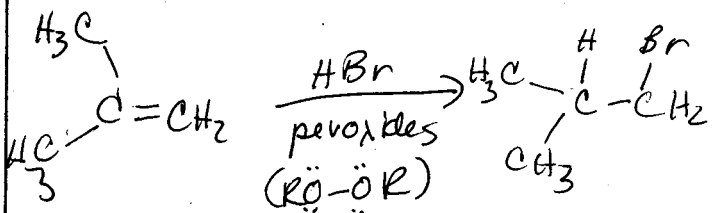
⇒ By way of radical ~~intermediates~~

Radicals: species w/ an unpaired electron

Recall: "standard" HBr addn to alkenes



HOWEVER



Anti-markovnikov product

Mech rationale??

Prelude: 2 ways bonds can break ⟶ cont.

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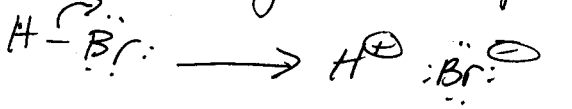
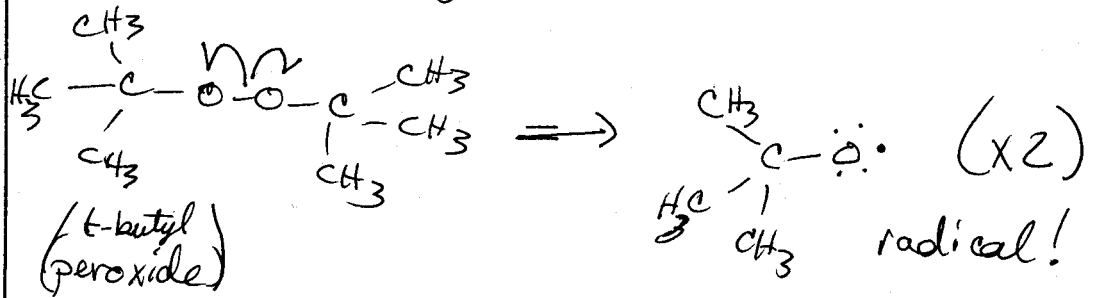
1. Heterolysis
- Pair of $e^{\ominus}$ go to one partner & not the other

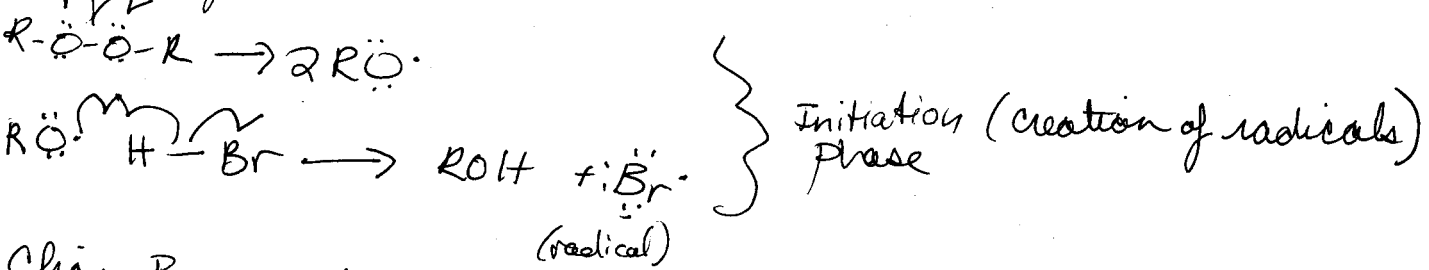


2. Homolysis
- Each partner gets one $e^{\ominus}$



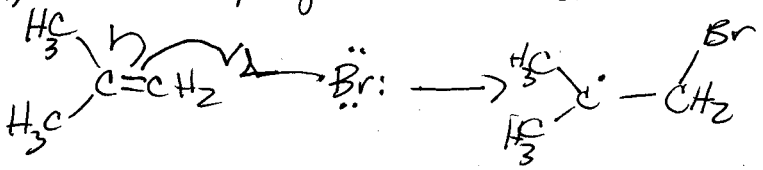
Note: Half-arrow convention

Rationale for anti-Markovnikov addn



Chain Propagation Phase:

1)



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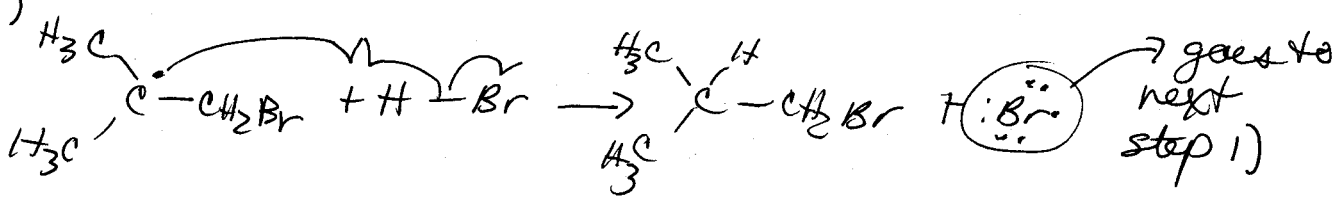
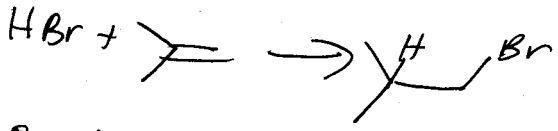
2)



Overall:

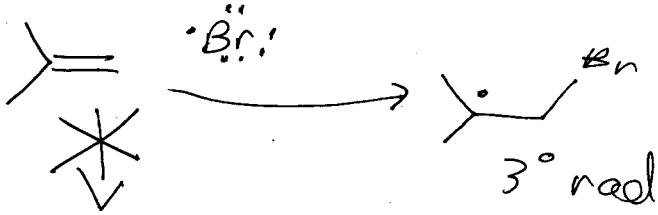


Origin of regioselectivity: Focus on step 1

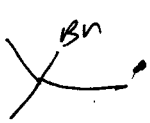
1. Sterics

:Br: is large, so it prefers the less congested side of alkene

2. C• stability parallels C⊕ ~~stability~~ (both ⊕ deficient)



3° radical -> more sub = more stable



1° radical